

Joint Research Centre

Certified reference materials for quantification of GMOs

Matrix GMO CRMs for measurement results expressed in mass fractions

Regulation (EC) No 1831/2003 demands the labelling of food and feed products containing more than 0.9 % GMO. The following matrix GMO CRMs are suitable for the quality control or calibration of mass fraction based GMO measurements.

CRMs are available as powders containing different levels of GMO mass fractions. The nominal mass fraction are given as rough indication only – each CRM comes complete with a certificate of analysis, specifying the certified mass fraction, its uncertainty and the traceability of the certified value (see example).

| Code | Species | Event name | Unique identifier | Nominal GM mass fraction [g/kg] |
|------------|---------|--------------------------|---------------------------|---------------------------------|
| ERM-BF410k | Soya | GTS 40-3-2 | MON-04032-6 | 0; 1; 10 and 100 |
| ERM-BF425 | Soya | 356043 | DP-356043-5 | 0; 1; 10 and 100 |
| ERM-BF426 | Soya | 305423 | DP-305423-1 | 0; 5; 10 and 100 |
| ERM-BF432 | Soya | DAS-68416-4 | DAS-68416-4 | 0; 5; 10 and 100 |
| ERM-BF436 | Soya | DAS-44406-6 | DAS-44406-6 | 0; 1000; 1; 10; 100 |
| ERM-BF437 | Soya | DAS-81419-2 | DAS-81419-2 | 0; 1000; 1; 10; 100 |
| ERM-BF421 | Potato | EH92-527-1 | BPS-25271-9 | 0 and 1000 |
| ERM-BF430 | Potato | AM04-1020 | BPS-A1020-5 | 0; 1000; 10; 40 and 100 |
| ERM-BF431 | Potato | AV43-6-G7 | AVE-436-G7 | 0; 1000; 10; 40 and 100 |
| ERM-BF435 | Potato | PH05-026-0048 | BPS-PH048-1 | 0; identity |
| ERM-BF422 | Cotton | 281-24-236 x 3006-210-23 | DAS-24236-5 x DAS-21023-5 | 0; 1000; 10 and 100 |
| ERM-BF428 | Cotton | GH8119 | BCS-GH00 5-8 | 0; 10 and 100 |
| ERM-BF429 | Cotton | T304-40 | BCS-GH00 4-7 | 0; 10 and 100 |



Accredited CRM Producer: the JRC-IRMM is accredited according to ISO Guide 34:2000 for the production of GMO certified reference materials and to ISO 17025:2005 for GMO testing under the code BELAC 268RM

Confidence in measurements

All certificates and detailed production information can be found at <https://crm.irmm.jrc.ec.europa.eu/>

<https://ec.europa.eu/jrc/>



Matrix GMO CRMs (continued)

| Code | Species | Event name | Unique identifier | Nominal GM mass fraction [g/kg] |
|------------|-----------|-------------------|-----------------------------|---------------------------------|
| ERM-BF411 | Maize | Bt176 | SYN-EV176-9 | 0; 1; 5; 10; 20; 50 and 100 |
| ERM-BF412 | Maize | Bt11 | SYN-BT011-1 | 0; 1; 5; 10; 20; 50 and 100 |
| ERM-BF413k | Maize | MON 810 | MON- 00810-6 | 0; 5; 20 and 100 |
| ERM-BF414 | Maize | GA21 | MON- 00021-9 | 0; 1; 5; 10; 20; 50 and 100 |
| ERM-BF415 | Maize | NK603 | MON- 00603-6 | 0; 1; 5; 10; 20; 50 and 100 |
| ERM-BF416 | Maize | MON 863 | MON- 00863-5 | 0; 1; 10 and 100 |
| ERM-BF417 | Maize | MON 863 x MON 810 | MON- 00863-5 x MON-00810 -6 | 0; 1; 10 and 100 |
| ERM-BF418 | Maize | 1507 | DAS-01507-1 | 0; 1; 10 and 100 |
| ERM-BF420 | Maize | 3272 | SYN-E3272-5 | 0; 10 and 100 |
| ERM-BF423 | Maize | MIR604 | SYN-IR604-5 | 0; 1; 10 and 100 |
| ERM-BF424 | Maize | 59122 | DAS-59122-7 | 0; 1; 10 and 100 |
| ERM-BF427 | Maize | 98140 | DP-098140-6 | 0; 5; 20 and 100 |
| ERM-BF433 | Maize | DAS-40278-9 | DAS-40278-9 | 0; 5; 10 and 100 |
| ERM-BF438 | Maize | VCO-01981-5 | VCO-01981-5 | 0; 1000; 1; 10; 100 |
| ERM-BF439 | Maize | 4114 | DP-004114 | 0; 1000; 1; 10; 100 |
| ERM-BF419 | Sugarbeet | H7-1 | KM-000H71-4 | 0 and 1000 |
| ERM-BF434 | Rapeseed | 73496 | DP-073496-4 | 0; 1000; 1; 10; 100 |

CERTIFICATE OF ANALYSIS ERM-BF426b

| | Mass fraction | |
|---------------------------|---|-------------------------------------|
| | Certified value ²⁾ [g/kg] | Uncertainty ³⁾ [g/kg] |
| 305423 Soya ¹⁾ | 5.0 | 0.8 |

- 1) Mass fraction of 305423 soya (unique identifier code MON-00810-6).
 2) The certified value is traceable to the SI.
 3) Expanded uncertainty, corresponding to a level of confidence of about 95 %.

User support

The following documents are available as free downloads from <https://ec.europa.eu/jrc/en/reference-materials/user-support>

- [ERM Application Note 4](#): Use of certified reference materials for the quantification of GMO in food and feed
- [ERM Application Note 5](#): Use of certified reference materials for the quantification of GMO in DNA copy number ratio
- [Guidance document on measurement uncertainty for GMO testing laboratories](#)



Calibrant and matrix CRM combinations for measurement results expressed in copy number ratios

Recommendation 2004/787/EC suggests to express the measurement results of GMO quantification measurements as the 'the percentage of genetically modified DNA copy number in relation to target taxon specific DNA copy numbers, calculated in terms of haploid genomes'. The following calibrant and matrix GMO CRM combinations are suitable for the calibration and quality control of copy number ratio based GMO measurements.

| Code | Species | Event name | Unique identifier | DNA copy number ratio |
|-------------|---------|------------|-------------------|-----------------------|
| ERM-BF413ek | Maize | MON 810 | MON- 00810-6 | Certified 0.77 % |
| ERM-AD413 | | | | Certified 1:1 |
| ERM-BF415e | Maize | NK603 | MON- 00603-6 | Certified 0.95 % |
| ERM-AD415 | | | | Certified 1:1 |
| ERM-BF425c | Soya | 356043 | DP-356043-5 | Certified 0.85 % |
| ERM-AD425 | | | | Certified 1:1 |
| ERM-BF427c | Maize | 98140 | DP-098140-6 | Certified 1.75 % |
| ERM-AD427 | | | | Certified 1:1 |

ERM-AD442k certified for quantifying mass concentration of Lambda DNA

| Parameter | Certified value |
|--------------------------------|--|
| DNA mass concentration (ng/μL) | 57.5 ± 1.1 |
| Copy number concentration | (1.20x10 ⁹ ± 0.17x10 ⁹) |

(Values in brackets are not certified)

How to order reference materials

From JRC in Geel

Tel.: +32 14 571 705 • Fax: +32 14 590 406 • <https://ec.europa.eu/jrc/en/reference-materials> • E-mail: jrc-irrm-rm-distribution@ec.europa.eu

From authorised distributors

LGC Standards GmbH (DE)
<http://www.lgcstandards.com/>
E-mail: de@lgcstandards.com

Sigma-Aldrich RTC Inc. (USA)
<http://www.RT-Corp.com>
E-mail: RTCSalesgroup@sial.com

Industrial Analytical (RSA)
<http://www.industrialanalytical.co.za>
E-mail: info@industrialanalytical.co.za

Sigma-Aldrich Chemie GmbH (CH)
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